REMARKS

Claims 2 and 5-12 are pending in the application.

Claim 11 is objected to under 37 C.F.R. 1.75(c).

In response, Claim 11 has been cancelled.

Claims 2 and 5-12 stand rejected under 35 U.S.C. §112, first paragraph, as allegedly failing to comply with the written description requirement. The Examiner believes that the claim amendments made in the amendment filed 26 September 2005 are not supported by the application and therefore constitute new matter.

In the amendment filed September 26, the claims were variously amended to recite that the chromium-oxide coat is formed directly on the metal surface. The Examiner believes that this subject matter is not supported by the disclosure.

The Examiner refers to the following portion of the application in support of the rejection:

> In the invention, a contact ability of an interface between the metallic material and a coat film is improved by coating chromium onto the metallic material of which the surface roughness (Ra) is not more than 1.5μm, in addition to strengthen a coupling force of the interface by applying heat treatment solves the poorness of the conventional adhesion, and in addition, the chromium-oxide passivation film excellent in corrosion resistance can be formed by applying oxidizing treatment. (Page 6, lines 3-11.)

The Examiner understands this text to require a chromium-only (i.e., non-oxidized) layer formed directly on the metallic material in order to provide the improved contact ability. ("It specifically states that the coat film is improved by coating chromium onto the metallic material." Office Action, ¶6.) According to the Examiner, the disclosure requires that a chromium-only layer be placed directly on the metal surface, followed by a chromium-oxide

layer being placed on such underlying chromium-only layer, to form a "chromium/chromium oxide surface treatment." In the Examiner's view, the disclosure supports a chromium-only layer, not a chromium-oxide layer, formed directly on the metal surface.

The rejection is based on the Examiner's understanding that the improved contact ability derives from the presence of a purely (i.e., non-oxidized) chromium layer formed directly on the metallic material surface. This interpretation is incorrect. Instead, the improved adhesion is due to the provision of a metallic material "of which the surface roughness (Ra) is not more than 1.5μm", which then allows the oxidized chromium coat to be formed directly on the metallic material surface, i.e., no intervening purely chromium layer is needed between the metallic material and oxidized chromium coat.

As the cited text states, the "contact ability of an interface between the metallic material and a coat film [later oxidized] is improved by coating chromium onto the metallic material of which the surface roughness (Ra) is not more than 1.5μm." (Emphasis and insertion added.) The referenced "coat film" is later oxidized to provide the oxidized chromium coat. The improved contact ability derives from the use of a metallic material having a surface roughness (Ra) of not more than 1.5μm, not the use of a chromium-only layer formed directly on the metal surface.

Indeed, the process by which the claimed products are made does first involve the deposition of a chromium-only coat on the metal surface. However, this chromium-only coat is then oxidized in such a manner that the oxidation penetrates fully down to the interface with the metal surface, i.e., there is no film of just chromium at the interface, as the Examiner maintains. Fig. 2 clearly shows that the oxidation of the referenced "coat film" occurs all the way down to the 0nm depth, i.e., right at the boundary with the metallic surface, thereby providing an oxidized

chromium coat formed directly on the metal surface. Fig. 2 does show different proportions of chromium and oxygen depending upon the thickness level, but the important feature is that all indicated depths show oxidation (i.e., chromium combined with oxygen), especially at the 0nm depth at the metal surface boundary.

It is precisely because the metal surface has the specified surface roughness of not more than 1.5μm that a chromium-only layer is not needed in the end product (i.e., after oxidation), since this surface roughness permits a chromium coat to be oxidized all the way down to the interface with the metal surface while preserving the adhesion with the oxidized-chromium coat. The claimed surface roughness permits a chromium-oxide layer to be provided in direct contact with the metallic surface.

The use of the specified surface roughness as the basis of the improved contact ability (adhesion) is found elsewhere in the disclosure at the following locations (emphasis added):

> Fig. 3 shows results after the corrosion test. From the results, it was not verified that corrosive products exist in the case of the surface roughness (Ra) of not more than 1.5μm, whereas the corrosive products have been scattered in the case of not less than 2μm. It is speculated that adhesion of the interface between the metallic material and the chromium-coat film deteriorates, so that clearance corrosion is caused as the surface roughness (Ra) becomes large.
>
> From the results as described above, it is speculated that the chromium-oxide passivation film having corrosion resistance, which is excellent in adhesion of the interface between the metallic material and the chromium-coat film can be formed when the surface roughness (Ra) of not more than 1.5μm. (Page 9, line 16 to Page 10, line 2.)

Since Fig. 3 is a "view showing results of evaluation surface roughness (Ra) dependence of corrosion resistance of the chromium-oxide passivation film" (Page 5, lines 1-3), the "adhesion of the interface between the metallic material and the chromium-coat film" cited above refers to a post-oxidation feature, i.e., the referenced "chromium-coat film" has been oxidized in

the manner illustrated by Fig. 2 to produce the noted "chromium-oxide passivation film" formed directly on the metal surface, i.e., there is no chromium-only layer at the metal surface boundary, but a chromium-oxygen layer (oxidized chromium coat). The oxidation penetrates all the way to the metal surface boundary, so that at this interface there is a chromium-oxygen film, i.e., an oxidized chromium coat deposited directly on the metal surface.

In view of the foregoing, Applicant respectfully requests that this rejection be withdrawn.

Claims 2 and 5-12 stand rejected under 35 U.S.C. §112, first paragraph, as allegedly being based on a disclosure which is not enabling. The Examiner believes that the thickness of the passivation film is critical or essential to the practice of the invention, but is missing from the claims.

The Examiner refers to the following portion of the application in support of this rejection:

> "From the results, it was verified that the chromium-oxide passivation film of substantially 100% has been formed, which is approximately 30 nm from the outermost surface." (Page 9, line 8-10).
>
> MPEP §2164.08(c) states as follows in relevant part:
>
> In determining whether an unclaimed feature is critical, the entire disclosure must be considered. Features which are merely preferred are not to be considered critical. ...
>
> Therefore, an enablement rejection based on the grounds that a disclosed critical limitation is missing from a claim should be made only when the language of the specification makes it clear that the limitation is critical for the invention to function as intended. Broad language in the disclosure, including the abstract, omitting an allegedly critical feature, tends to rebut the argument of criticality.

The disclosure cited by the Examiner does not establish that a 30nm thickness limitation is critical, particularly in view of other disclosures not cited by the Examiner that indicate no

such criticality. For example, in the concentration versus depth data shown in Fig. 2, a totally chromium-oxide film exists without interruption from 0nm (interface with metal) to at least a depth of 100nm, although the respective percentages of chromium and oxygen do vary depending upon depth. The disclosure relied upon by the Examiner is not mandatory but merely illustrative.

Applicant believes that the application is in condition for allowance and respectfully requests favorable action in accordance therewith.

In view of the foregoing, Applicant respectfully requests that the rejection be withdrawn.

If the Examiner has any questions or comments that would advance prosecution of this case, the Examiner is invited to call the undersigned at 260/602-6344.

Respectfully Submitted,

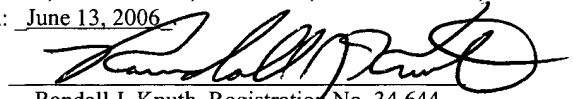
Randall J. Knuth
Registration No. 34,644

RJK/

Enclosures: Amendments to the Claims
(3 Sheets)
Explanatory Cover Sheet - Page 1
Petition for Extension of Time
Check No. 9100 ($ 1810)
Return Postcard

CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450, on: June 13, 2006



Randall J. Knuth, Registration No. 34,644

June 13, 2006
Date

Customer No.: 022855
RANDALL J. KNUTH, P.C.
1507 Yuma Court
Murfreesboro, TN 37129
Telephone: (260) 602-6344
Facsimile: (615) 413-5069
Email: randy.knuth@rjkpc.com